

WHAT IS CLAIMED IS:

2 1. A material comprising at least two nanoparticles dispersed in a polymer matrix.

1 2. The material as recited in claim 1, wherein the nanoparticles are silicon
2 nanoparticles.

1 3. The material as recited in claim 1, wherein the polymer matrix prevents the at
2 least two nanoparticles from aggregating.

1 4. The material as recited in claim 2, wherein the polymer matrix prevents the at
2 least two nanoparticles from aggregating.

1 5. A method comprising the steps of:

2 adding a nanoparticles solution to a polystyrene and chloroform solvent;

3 casting the combined solutions on a substrate;

4 evaporating the solvent leaving a film of polystyrene formed with the nanoparticles
5 embedded therein.

1 6. The method as recited in claim 5, wherein the nanoparticles are silicon
2 nanoparticles.

1 7. The method as recited in claim 5, wherein the nanoparticles are dispersed in the
2 film in a non-aggregated manner.

1 8. A display apparatus comprising:

2 a pixel element comprising a phosphor of at least two silicon nanoparticles dispersed in a
3 polymer matrix.

1 9. The display apparatus as recited in claim 8, wherein the at least two silicon
2 nanoparticles are dispersed in the polymer matrix in a non-aggregated manner.

1 10. The display apparatus as recited in claim 9, wherein the pixel element further
2 comprises first and second subpixel elements, wherein the first subpixel element comprises
3 silicon nanoparticles of a first diameter size selected to emit light of a first wavelength, and
4 wherein the second subpixel element comprises silicon nanoparticles of a second diameter size
5 selected to emit light of a second wavelength different than the first wavelength.

1 11. The display apparatus as recited in claim 10, further comprising:

2 a cavity containing a gas that emits ultraviolet light when energized by an electric field,
3 the ultraviolet light bombarding the pixel element to cause emission of visible light from the
4 silicon nanoparticles.

1 12. A photovoltaic cell comprising:

2 an anode;

3 a cathode;

4 a conducting polymer layer adjacent the anode; and

5 a polymer/silicon nanoparticles layer comprising silicon nanoparticles dispersed within a
6 polymer matrix, the polymer/silicon nanoparticles layer adjacent the cathode and the conducting
7 polymer layer.

1 13. The photovoltaic cell as recited in claim 12, wherein the conducting polymer
2 layer comprises a conjugated polymer.

1 14. The photovoltaic cell as recited in claim 12, further comprising a storage cell
2 coupled to the anode and the cathode.

1 15. A photovoltaic cell comprising:

2 an anode;

3 a cathode;

4 a first polymer/silicon nanoparticles layer adjacent the anode and having a first optical
5 absorption edge; and

6 a second polymer/silicon nanoparticles layer adjacent the cathode and having a second
7 optical absorption edge different than the first optical absorption edge.

1 16. The photovoltaic cell as recited in claim 15, wherein the first and second
2 polymer/silicon nanoparticles layers absorb light at different wavelengths.